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Rail Road News.

Distressing Accident on the Central, Pa., Railroad.

On Thursday, the 3rd inst., the passenger train of cars on the Central Railroad, while coming from the West, came in collision with a burden train above Petersburg, Perry county. Mr. Hurtz Heisley, an assistant engineer on the road, was so severely injured that he died in a short time. Mr. Hall, engineer of the locomotive and Mr. Hand, conductor, were also badly hurt.

Railroad Robbery.

On the night of the 3rd inst., as Mr. Warden the depot master at West Townsends, on the Fitchburgh Railroad, was sitting in the office, two men, disguised, entered, gagged him, and robbed him of $400. They then bound him hand and foot, put him inside of a freight car, hung him by the heels, locked the car-door and decamped. When found about an hour afterwards, Mr. W. was nearly dead.

Tearing up a Railroad.

A few weeks ago, a company of some seventy-five residents on the line of the Pontiac Railroad, in Detroit, turned out and tore up a portion of the rails, for the purpose of preventing the cars from passing into the city. Several were arrested, aud gave as a reason that the road is a nuisance, because it obstructs the highway.

Rise of Railroad Fares.

A number of the Massachusetts Railroads have raised their fares. They must have tested the utility of high and low prices. The Boston and Worcester Railroad, after the 1st inst., commenced to charge 2½ cents per mile, and 3 cents between way stations. The Old Colony Road has also raised its fare to 3 cents per mile. This is at the rate of $3 per hundred miles.

Mohawk and Schenectady Railroad.

The Mohawk and Schenectady Railroad made 3½ per cent. dividend, payable on the 20th January This result of skillful and economical management must be gratifying to the stockholders. Not long since this stock was selling at 30 per cent., now it is worth 90.

Our Own City.

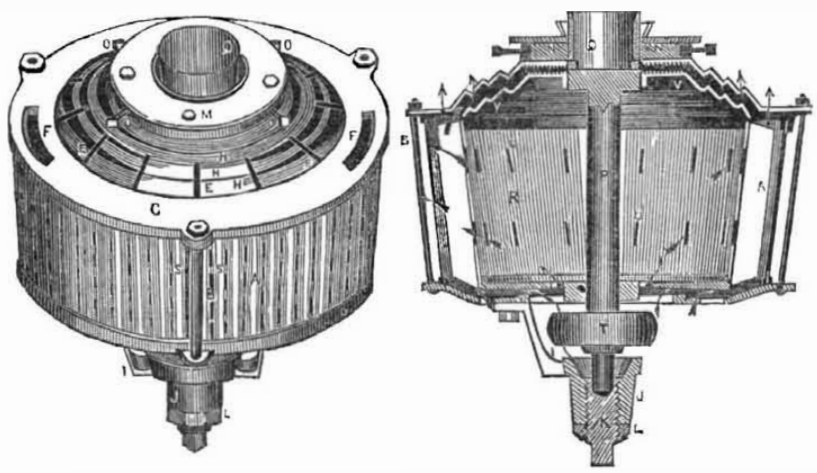
New York City has a larger population than either of the States of New Hampshire, Conneticut, Vermont, or Michigan. It has fully the population of New Jersey. It has more than the three States of Arkansas, Florida, and Texas, together. It also has more population than the States of Rhode Island, Iowa, and Deleware, added with that of Oregon territory.

The Jews have obtained a firman from the Turkish Government to admit of their building a temple on Mount Zion, which they pray may equal in splendor that built by King Solomon.

The Steamship Crescent City, while on her recent voyage to Chagres, broke the cross rail of her engine.

NEW SMUT MACHINE.

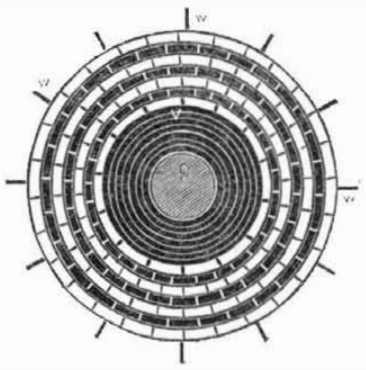
Figures 1. Figure 2.



This machine is the invention of Mr. C. D. Gordon, of West Martinsburg, and Mr. S. S. Gouldthrite, of Lowville, Lewis Co., N. Y, who have taken measures to secure a patent. The machine is very neat and beautiful in its construction, and combines good principles for effective operation.

Figure 1 is a perspective view. Figure 2 is a vertical section, showing the inside; and figure 3 is a top view of the corrugated scouring surface. The same letters refer to like parts. A is an outside circular screen (with perforations, S S) which may be made of tin or sheet iron; C and D are top and bottom metal plates, with a groove in each, around, into which the edge of the screen, A, is set, and they are secured together by screw rods, B, fastened by nuts in the flanges of the two circular plates. The top plate, C, is the cover. Figure 3 shows its interior form; Q is a hopper into which the grain is carried by a spout, from any situation. This hopper is like a cup in the centre of the machine, and it revolves. It is therefore secured on the top of an upright shaft, P, to which is connected an air chamber, R, (fig. 2,) which is made with fans on its outside, indicated by W W, fig. 3. These fans revolve between the outside screen, A, and

FIG. 3.



the inside revolving chamber, R, to act the part of a blower. The inside revolving chamber has slits, U U, in it to allow the wind to pass through to separate the smut, &c., and drive it through the perforations in the screen, S. also through the large slits, F, and the smaller slits, E E, in the cover. There are openings at the sides in the bottom of the hopper, Q, and through these openings the uncleaned grain passes into the rubbing or scouring chamber, which is formed between the cover, A, and the metal top of the revolving chamber (fig. 2.) The inside of the cover and the top of the revolving chamber are formed alike, of a stair form, as represented by H H, fig. 1, and V V, figures 2 and 3, are scouring grooves, which direct the grain from the hopper, outwards, between the stair formed chamber, wherein the grain is scoured round and round, breaking the balls, before the grain is directed into the annular chamber, between the outer screen, and the revolving air chamber, R. where it falls down into a receptacle below, meeting a strong current of air, when all the smut is entirely driven out through the perforated screen, and the wheat beautifully cleaned. By observing the form of the inside of the cover, and the form of the top of the revolving air chamber, in figures 2 and 3, a good idea of the scouring and cleaning operation of the machine will be obtained. The arrows indicate the direction of the blast. The air enters through holes in the bottom plate of the revolving chamber, which chamber being secured on the spindle, P, is driven by a band (from any power) passing around the pulley, T, (fig. 2.) The spindle, P, runs in a proper screw step bearing, K, with an oil cup on its top, and L is a nut. J is a collar, and from it two arms, I (one not seen) support the bottom fixed plate, D. On the top is a steadying collar, M, around the revolving hopper. It is secured on the top of the cover, C, by vertical screws, and has side setting screws, O O, fig. 1, passing into an armed plumbing socket, N N, (fig. 2.) The larger impurities are driven through the larger slits at the top, and the finer impurities through the screen.

By the foregoing a very correct knowledge of the construction and operation of this excellent machine will be obtained—and further information about business matters, may be obtained by letter (*p. p.*) addressed to the inventors.

Dress in Japan.

The Island of Japan is said to be the only country where a change in the fashion of dress has not occurred during a period of 2,500 years. All individuals, from the highest to the lowest, wear the *bata*, a species of wide frock, or gown, and the only difference is in the material and number worn—some of the richer class wear as many as twenty-five, of various colors, and of exceedingly light texture. We have very little knowledge concerning the resources, manners and customs of the Japanese.

By the late Report of the U. S. Treasurer, our exports for the last year amounted to $145,755,820, and out of this Great Britain and her dependancies took $84,000,000. Our commercial interests are stronger with one nation than all the world beside.

There is a rumor that the British Ministers intend, in the coming session, to prove their sincerity in the matter of sanatory reform and in that of education, by abolishing the health-destroying window tax, and the mind duties on paper.

Useful Receipts.

The Chlorides of Gold.

Great difficulty has hitherto occurred in preparing the chloride of gold, of the yellow and red colours, perfectly soluble in water, and without suffering reduction. The following process are recommended for this purpose:—

1st. In order to prepare the yellow salt of gold, take aqua regia prepared with three parts of hydrocloric acid, one part of nitric acid, and one of distilled water. Then put one part of pure gold into a porcelain capsule with a plate of glass and heat it in a salt-water bath, the heat being continued till red vapours cease; the cover is then to be removed, and if the gold is not entirely dissolved some aqua regia is to be added to it, the capsule being again covered, the heat is to be continued till vapour ceases to appear; the glass plate must be removed and replaced by folds of blotting paper, the heat being continued in the bath, until a glass rod, upon being immersed in the capsule, becomes covered with yellow solid chloride of gold.

The capsule is then to be removed from the salt-water bath, and the chloride of gold soon chrystalizes in small prismatic crystals, of a fine yellow colour, with an orange tint. The chloride thus obtained is perfectly soluble in water without reduction; it is successfully employed in daguerreotype and like operations.

The red chloride of gold (res-chloride) is prepared in the same manner, except that the aqua regia employed is prepared with two parts of hydro-chloric, and one part of nitric acid. The operation is commenced by acting upon salt with excess of aqua regia on a sand bath, the salt water bath not being used until the gold is entirely dissolved; the remainder of the operation is conducted in the same manner as that for the yellow chloride.

Cochin China Fowls.

The most remarkable specimen of barn-yard fowl, in this country, are undoubtedly the "Cochin China." Not long since we saw some of them grown by B. Tiffany, Esq., of Southbridge, Mass. a gentleman of peculiar *taste* and experience in all that relates to good farms, stock, and general farming appendages. He represents them as possessing excellent properties for the table, prolific layers, and uncommon in their attention to the young. They have another and quite important advantage over the common barn-yard fowl, and that is nature, in bestowing upon them their physical capacities, (which in all other respects they stand pre-eminent) saw fit to clip their wings, thus saving the poulterer the trouble of performing the operation. A common picket-fence is good against their encroachments.

It has been stated that one egg of the pure Cochin China Fowl, of the Baylie's importation, contains nearly as much nutritious matter as two eggs of the Black Poland or Golden Pheasant Fowl, and is consequently much richer, better flavored and more valuable.—Something depends probably upon the way in which they are kept.

Parsneps.

This is a most valuable root for feeding animals, and should be cultivated more extensively than it is. It stands severe frost well, and is easy of cultivation.

A Salt Spring, 3 inches in diameter, 600 feet deep, and yielding 300 bushels of salt per day, has been discovered in Mercer county, Va., about six miles from the Red Sulphur Springs.

This present Congress is going to reform the Patent Laws, it is supposed.

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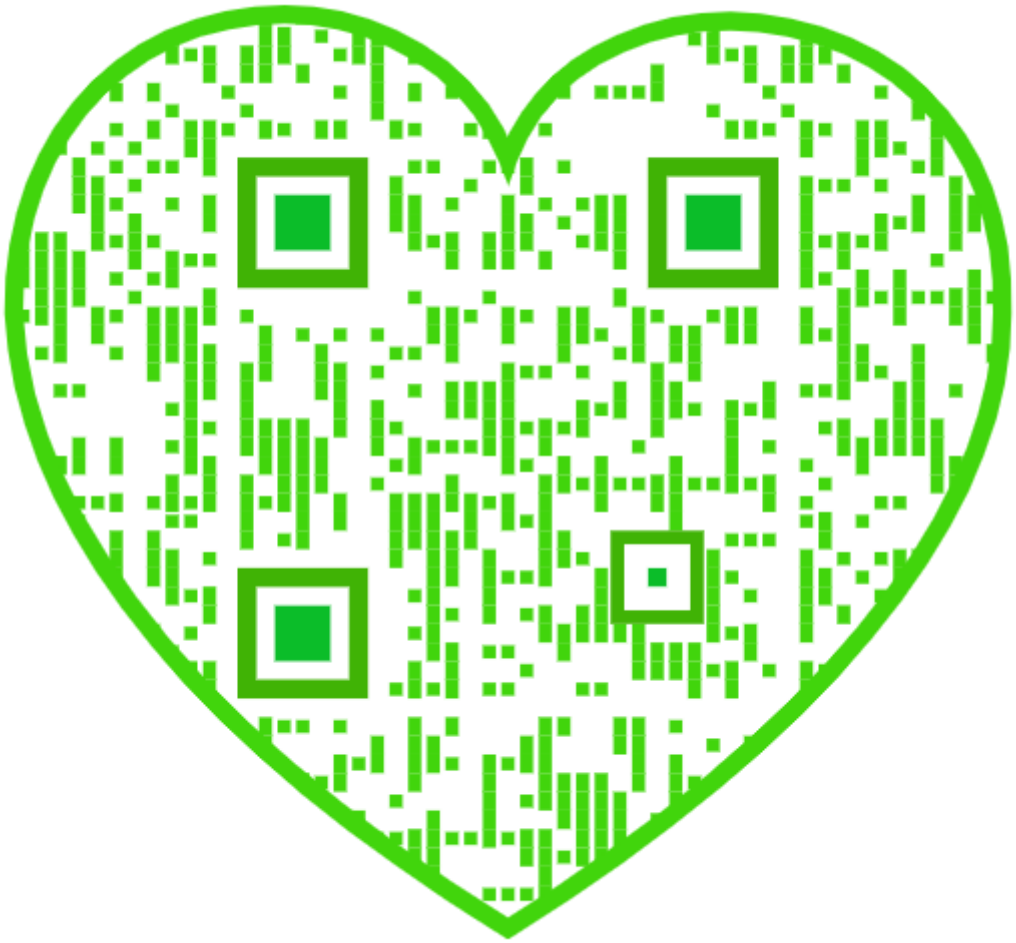

Miscellaneous.

Correspondence of the Scientific American.

WASHINGTON CITY, Dec. 5, 1850.

Since I last wrote, the machinery of another year has commenced its revolution, and who can predict the hidden treasures of science it may bring to light ere it closes. No obscurity rests on the map of knowledge which is revealed to the eye of science in its anticipation of progressive advancement. Commerce, through its aid is opening lines of intercourse that are surmounting the barriers of nature and the impediments of policy. Whilst one agent is riding flood and field, blending plain and city, another more subtle, is changing days in minutes and miles into the smallest divisions of space. The opinion of the explorer is scaling the mountain heights and piercing the abysses of nature to define the path of the searcher of her treasures. The philosopher is hourly extending the boundaries of scientific lore, and finds its limits to recede from view with every advance he makes; whilst mechanical invention finds no bounds in applying its exhaustless combinations to the purposes of art! Human enterprise in all its forms of activity is thus bringing into rapid connection, the races which distances divide and prejudices alieniate.

The new patented process of Dr. Wall for improving iron, showing that electricity is developing itself to science, as well as establishing its power in the arts and manufactures, excites much attention: It consists in passing a current of voltaic electricity through a mass of fused metal during the time of its melting, cooling or consolidation, either in the blast, pudling or other furnace, the consequence of which is, that all sulphur, phosphorus, arsenic, or the semi-metals, ever found, more or less in all metals and ores, are evolved, or driver off, and which if allowed to remain would interfere with the molecular arrangement make the metal brittle or otherwise deteriorate its quality. It is claimed that this discovery is decidedly the greatest and most economical which has ever been placed within the reach of manufactures.

Mr. Cochran, a native of one of the New England States, has invented a machine for preparing the irregularly formed timber required for ship building. It is said that it performs its work so well as to give promise of superseding hand labor altogether.

A committee appointed at a recent Iron Masters meeting in Baltimore, are on here for purpose of urging the Maryland members of Congress to aid in changing the duty from a sliding to a fixed standard on iron. They contend that the cause of depression in our iron business, is owing to fluctuations in the English and Scotch markets, and that the difference in the manufactures here and there is in the wages paid to the workmen employed in the manufacture. Since 1846, when the tariff was passed, the price of foreign iron, with duty, has fallen from $65 per ton, to $35, a fluctuation of $30.

From an official document lately sent to Congress, it appears that the standard silver of the United States consists of 1845 parts of pure silver and 179 parts of copper. The dollar contains 416 grains of standard silver of which 37¼ grains are pure silver and 44¾ alloy. The proportional value of pure gold to pure silver by the laws of the United States, is a 15 to 1. One pound of pure gold is equal to 15 pounds of pure silver.

The Booker gold mine in Buckingham Va., yielded gold worth $6,300 in thirty-four days, thirty hands being employed. As the expense are rated at $30, per day, the clear profit was $5000.

[Dr. Walls process of passing the electric current through the mass of iron in the manufacturing it, described in Vol. 2 Sci. Am. Its value has been exaggerated. It is not possible for a current of electricity to separate each metal of an alloy in the furnace. Some of our ores, we believe, would be more injured than benefitted by the employment of the battery.

Mr. Cochran, we believe, is from this city, and was introduced very favorably to the Lords of the Admirality in England. He has a patent for England and one for his native land. A few months ago, we noticed that his English patent was contested by Mr. Hamilton an American inventor of New York also, and with success. Mr. Hamilton's patent being much older, Mr. Carpmael stated that the principle of Mr. Cochran's machine was the same as that of Mr. Hamilton's. It was something singular to see two New Yorkers fighting about their inventors before the British Court of Chancery; this shows the wide spread genius and enterprise of our people.—ED.

International Literary Exchanges.

Very few of our citizens are aware that the valuable works procured by Monsieur Vattemere, as a present from the city of Paris to the city of New York, are deposited in the corporation library in the City Hall, and comprise the most rare works connected with that ancient city, besides magnificent engravings of Nineveh and rare antiquities. Mr. Vattemere has commenced another great and important work in obtaining from every State in the Union such books as have been published in the State, and copies from publishers of each work issued in this country, to be placed in the Hotel de Ville, at Paris, as the library of America. Several States have already made their donations, and others will follow. The Common Council have now an elegant library, which should he made comfortable and thrown open to the public. They should also appoint a suitable librarian, and it will soon increase in magnitude and importance, giving it as much publicity as possible in order that our mechanics and laborers, may avail themselves of its advantages.

We trust that this generons gift will not be embarrassed by any selfish considerations on the part of those who have its immediate management, it belongs to our citizens and they should see that its advantages are thrown open to those, whose means are inadequate to possess the volumes thus given.

Monsieur Vattemere's indefatigable efforts in producing such important international exchanges, are entitled to the warmest gratitude of the American people.

Parkhurst's Cotton Gin.

In answer to several enquiries from Southern planters, in regard to the above gin, we can only state that, judging its qualities from the notices we have seen in some of our cotemporaries, it would be considered a very valuable invention. But we regard it at present as a doubtful affair, and must wait until we are more thoroughly enlightened as to its operating value. It seems very unaccountable to us why it is not brought before the public. Will the inventor or his agents clear up this point, and thereby relieve many anxious enquiries? Our columns are open to them for this purpose. Silence will be tantamount with us to an acknowledgment that it is no improvement over the ordinary gin.

Our Cotton Factories.

An article in the St. Johns (N. B.) Observer, states that a number of girls, who were beguiled under flattering promises to leave the Province and work in our New England factories, have returned broken down in constitution, enfeebled for life, and some of them mentally deranged. "They were enslaved," says the Observer, "to a most toilsome and unhealthy occupation," and could not lay by a single cent.

The English Language.

The English language is yet destined to be the universal language. It is now spoken by more people than any other language, and is increasing in range and extent two-fold faster than any ether. It is now spoken by fifty-five million, and the next to it is the Russian—forty-three millions, thirteen millons less. In eighty years more it will be spoken by three hundred millions, and our Republic will be the greatest empire on the face of the globe.

Gen. Rensselaer Van Rensselaer, who figured as the hero of the Navy Island War, during the Canadian troubles, put an end to his life on the first of January at Syracuse, by inhaling charcoal gas.

Coal.

The immense beds of bituminous coal found in the valley of the Ohio, fill the mind with wonder and surprise, as it reflects on the vast forests of aborescent and sandstone, until the whole series had accumulated plants required in their formation.—Age after age; successive growths of plants, springing up in the same region, were entombed beneath thick strata of shale to the depth of more than a thousand feet; while beneath the whole lay the bed of an ocean floored with fossil salt. Indications of coal are found at intervals, across the great valley, from the Alleghany to the Rocky Mountains. It is found near the surface in Kentucky, Ohio, Indiana, Illinois and Missouri, and without doubt, may be found beneath the extensive tertiary deposits, which form the substratum of the great prairies in the central and northern parts of the Western States. As low down as New Madrid on the Mississippi, coal was thrown up from beneath the bed of the river, by the great earthquake of 1812—a sufficent proof of its continuation in the most depressed part of the great valley.

The coal is of vegetable origin no one who has read much on the subject, or personally examined the coal beds, will now deny. Time was, when it was considered a peculiar miner, al product formed in the earth in the same manner at the same time with the rocks that surround it. The product of its chemical analysis, being altogether vegetable, and the artificial formation of coal from wood by Sir James Hall, have silenced all doubts on the subject. The only mystery now is, how such vast quantities of vegetable matter could be accumulated and grow on the spot where they were buried. That they grew in general, on the surface now occupied by the coal appears certain from the perfect state in which the most delicate leaves and stems are preserved. Had they been transported by currents of water and especially from any distance, it is hardly possible that they should not have received more damage. The climate at that period must have been more warm and more humid than at present, as many of the plants are of families which now grow only in tropical climates; and as the laws of nature never change this may be deemed a correct inference.

Morals of New York.

DRUNKENNESS.—By the Report of the Mayor of this city, we learn that there have been a decrease of 523 persons taken up for drunkenness, and crimes resulting from the same, during the last six months, as compared with the last six months of 1848. This is good news.

JUVENILE THIEVES.—There are 3000 juvenile thieves in this city. They prowl in gangs and commit many depredations. The Bleecker Street Presbyterian Church, of this city, has made a noble effort to reclaim many wandering and vicious boys, in that district of our city. They have established a boys school, and on Sabbath afternoons some of the members go there and teach nearly 200 outcast juveniles, collected from the docks and other evil places of resort. The cause is a noble one, because it is so disinterested and trying—no one can conceive how trying and difficult the task is, to make impressions on the seared hearts of our vicious youth.

Debt of the City of New York.

This city owes a debt of $12,522,768. The amount of Stocks issued for the Croton water amounts to $13,837,000, so that all our city debt arises from the construction of this stupendous work, and more than one million of dollars have been paid of it. The principal and interest pledged for the redemption of this debt will extinguish it in 35 years. The debt is an honorable one, and considering the great amount of wealth in N.Y., no one can say that it is great. We hope however, that the finances will always be managed with economy, and due attention will be paid to decrease the price of those things that add to the general good, such as cheap gas light, &c.

There should be public washing-houses and public baths and rookeries of old buildings should be torn down and room to breathe given to the pent up, poverty-stricken, vice-debased inmates of some districks in our city.

Patent Office Business.

At the commencement of the New Year we made an important acquisition to our former arrangements for transacting Patent Business, securing the services of two thoroughly versed examiners, who, with our former corps (all being retained) renders our facilities for attending to Patent business better than any other Agency in the Union. We have a list of all the American Patents that were ever granted, and in most cases can inform an inventor, on examining his invention, whether his case is a patentable one or not,

Specifications and Drawings executed at the shortest notice, and guaranteed to answer the requirements of the Patent Office.

The vast amount of Patent business which is executed at this office, renders our facilities better for executing the work, which is entrusted to our charge, thorough and at smaller prices than is charged by other agents.

For further particulars enquire of the 200 patentees who have secured inventions through the Scientific American Office in 1849, and see advertisement on another page.

Death of two Inventors.

A short time ago Mr. Schenck, an American inventor, died a short distance from Belfast, in the North of Ireland, where he had gone to introduce some valuable improvements in the manufacture of flax.

Mr. J. Kyan, the English inventor, who gave his name to Kyanized wood, died in this city, on the 5th inst. He was 75 years of age. He had been engaged with the Common Council of this City in making a plan to filter the Croton water.

The Dead of 1849.

It appears that about one hundred remarkable persons died during the year just closed. Among the most prominent are ex-President Polk, Gen. Worth, Gen. Gaines, Col. Duncan, Geo. W. Whistler, American Engineer at Moscow; Albert Gallatin, and Mrs. James Madison.

The committee of the Salford Town Council, England, for the management of the corporation gas works, report that notwithstanding a reduction of charges from 6s. and 5s. to 5s. and 4s. per thousand cubic feet, there has been a great increase in the rental. In the city of New York the price of gas is about four times as much, and not very good at that. It surely might be a great deal cheaper.

Two mechanics of Wilmington, Del., have written to Daniel Webster and Henry Clay asking their aid to assist in the construction of a magnetic telegraph between this country and Great Britain. They feel confident of the success of their invention.

A correspondent enquires for information concerning the discovery of Mr. Paine, now attracting public attention We have given all we have been able to obtain. Some of Mr. P.'s endorsers will not contribute much to its popularity we fear, but quite the reverse.

Among the questions before the French Assembly, at the last dates, was that of rendering obligatory the observance of the Sabbath, or rather, abstinence from work on that day.

A meeting has been held in this city by gas consumers, to take into consideration the suplying of themselves with gas at one half the present price.

Dr. Samuel Woodward, formerly Superintendant of the Insane Hospital at Worcester, died at Northampton last Thursday evening, the 3rd, aged 63 years.

"A brass rudder has been cast in Philadelphia, which weighs 3000 tons."—Springfield (Mass.) Republican.

Wonder if Deacon Bowles can give the dimension of the ship that is to carry that enormous rudder.

The people in some parts of New Hampshire and Maine, have commenced to use *peat* for fuel.

The last news from Europe informs us that there was still a difficulty of the Pope's return to Rome.

A new perpetual motion has been invented by a Philadelphian named Reeve.

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For the Scientific American.

Useful Information about Water Wheels.

I have made several to me very interesting experiments on Water Wheels, and came to the conclusion that I had made some discoveries on Hydrodynamics, and used the following rule for re-action wheels to find the velocity of the water per minute, under the head I wished to erect the wheel—(I used the rules laid down by Smeaton)—from which subtract one-third for the velocity of the wheel at the centre of issue, then use 1500 lbs. of water per second for each bushel of wheat the stones were required to grind per hour; this gave me the volume passing through the wheel; I then found the amount of issue it required to receive the water. I then found the diameter of the wheel that would receive the proper number of buckets, to form these issues; I then made a disc or head of plank two inches thick, doubled at right angles, of a diameter of two inches more than the circle of the buckets. To strengthen the wheel I then made an annular rim of the same diameter of the disc, through the centre of which I cut a circular opening of five times the area of the whole of the issues of the wheel; the rim was of sufficient width to just cover the inner end of the buckets, and was worked off to a thin edge at the heel, so as to pass through the water with the least possible friction. The buckets would be about 3 inches thick, so as to pin and bolt through. I used from 8 to 12 buckets—being less than any other workman I then knew of; some 3 or 4 inches of the issue end I made of iron, about one-quarter inch thick, to prevent the wood of the bucket from splitting. This was the most approved method previous to Parker's improvement.

Seventeen years ago last spring I heard of Mr. Z. Parker, I went to see him, and found he had covered all my improvements by his patent—knowing nothing of me nor I of him. He had united percussion with re-action. I was unable to find any improvements in advance of Mr. Parker, and I set myself to study his theory and erecting his wheels. His theory clashed with all others I read of, or heard of, but so far as I had experimented I thought him correct. I had found that a wheel at its periphery could outrun the water that propelled it, which was denied by all authors, who asserted that "no wheel could be made to run at its periphery as fast as the stream which drives it."

In unison with Mr. Parker, after seventeen years' experience, I do assert that his wheel at its periphery, run 107 per cent. of the velocity of the water that propels it, at its maximum; also that his tables are correct. I have used them ever since he had them printed; previous to the printing we used the following rule:—Divide the velocity per minute by the number of revolutions of the wheel we wish the stones to make or the saw to cut, and it will give the circumference of the wheel, from which get the radii; then use 1000 lbs. of water per second for each bushel of wheat per hour we wish the stones to grind, or for each square foot of soft wood we wish the saw to cut per minute, gives the area of inlet to the wheel; also the area of the issue of the wheel,—these two being the same, is at present much controverted and condemned by many experts. At the recent trial for an infringement at Columbus, Ohio, by which I find many good operatives are to this day in the dark in the neighborhood of the seat of this great improvement. We have erected some twenty wheels within thirty miles of where I now write, that seldom draws a full gate; the wheels all perform well. It is our usual practice to make the inlet to the wheel, precisely the same as the area of the issue of the wheel, under all heads. We sawed a log eleven feet long, which was slabed off to two feet, and turned down in one minute, with eight feet five and a half inches head; we run back, set and sawed for 18 minutes, and sawed 108 feet of boards half an inch thick, with 27.6 cubic feet of water per second; we also ground 35 bushels of corn into meal in one hour, with a four feet French stone, of the blueish cast, rather of a hard close order, manufactured by Herbert & Wright, of Louisville, Ky., with 15.5 cubic feet of water per second, which proves the accuracy of Mr. Parker's tables, and that he has rated them on the safe side. Millwrights who erect his wheels and do not come up to the tables, had better learn to do it right before they condemn them. I often hear millwrights and others exclaim against them to their own condemnation. We have put in operation mills that will do more than the above, but the co-efficient of the mills is about the same.

Before I close this already lengthy subject, permit me to lay before your readers a very important item, which is, that in many situations the banks are so high as to render the pitman useless by its length; but in such cases we erect the wheel high in the head, as in the case of Maj. Kightley's mill, near Ballardsville, which has eight feet head; we put his wheel at centre four feet above the tail water, and four feet below the head water; it will run until the water runs down some inches below the covering of the wheel, so that the water rises several inches higher than its head, and drives the saw with the same power the wheel would at 4½ feet head. In this mill we made the pitman three feet shorter than otherwise could be done without gears; we use no gears for saw mills or grinding mills, we always couple the spindle of the stones to the shaft for all kinds of grinding mills. We run some of the stones up to 225 revolutions per minute, smaller ones more for corn; we run four feet wheat stones 160 revolutions per minute.

We have just finished a merchant mill for E. F. Wade, Esq., Attorney at law, a gentleman of science, who asserts that he can grind more grain and saw more lumber with a given quantity of water, with the Parker wheels, than he could with the over-shot wheels we took out. Two of them were 13 feet diameter, one nearly new, of excellent workmanship, of the common construction of this country.

These are stubborn facts, and may be seen by calling at the mills three miles from Westport, Oldham Co., Ky.

Yours respectfully, J. S.

Floydsburgh, Va., 1850.

Natural History of the Sabbath.

The Creator has given us a natural restorative—sleep; and a moral restorative—Sabbath-keeping; and it is ruin to dispense with either. Under the pressure of high excitement, individuals have passed weeks together with little sleep or none; but when the process is long continued, the over-driven powers rebel, and fever, delirium and death come on; nor can the natural amount be systematically curtailed, without corresponding mischief. The Sabbath does not arrive like sleep. The day of rest does not steal over us, like the hour of slumber. It does not entrance us almost whether we will or not; but addressing us as intelligent beings, our Creator assures us that we need it, and bids us notice its return, and court its renovation. And if, going in the face of the Creator's kindness, we force ourselves to work all days alike, it is not long till we pay the forfeit.

The mental worker—the man of business, or the man of letters—finds his ideas becoming torpid and slow; the equipose of his faculties is upset, grows moody, fitful, and with his mental elasticity broken, should any disaster occur, he subsides into habitual melancholy, or in self-destruction speeds his guilty exit from a gloomy world. And the manual worker—the artisan, the engineer—toiling on from day to day, and week to week, the bright intuition of his eyes gets blunted, and forgetful of their cunning, his fingers no longer perform the feats of twinkling agility, nor by a plastic and tuneful touch, mould dead matter, or wield mechanic power; but mingling his life's blood in his daily drudgery, his locks are prematurely gray, his genial humors sour, and slaving it till he has become a morose or reckless man, for an extra effort or any blink of balmy feeling he must stand indebted to opium or alcohol.

[The above is from the North British Review, which is perhaps the most able Review in the world, at least it is second to none. We commend the subject to the attention of every mental and physical worker. Nature has given us seasons of sleep, and we might well ask, "why were we not made to live on without them." We cannot tell, but knowing what exists, we should follow the laws of nature; and one day in the seven, as a day of rest, is as essential to health as regular sleep. It has a moral influence also, but this is a question which belongs to a religious paper to discuss, we look only to the physical laws with which it is connected, and view it in the light of a scientific subject.

Survey of Great Britain.

The whole of England and Wales, with the exception of the six northern counties, has been surveyed, and the maps published, on the scale of one inch to a mile. This scale, however, was found to be too limited and defective to be of value for local engineering purposes, and for the improvement of the country; and the remainder of the survey was accordingly ordered to be finished on a scale of six inches to a mile, as regards the country; but as regards towns, they are to be laid down upon a scale of five feet to a mile, in all cases where the number of inhabitants amounted to 4000. The six northern counties of England, namely, Lancashire, Yorkshire, Northumberland, Durham, Cumberland and Westmoreland, have all to be surveyed on this larger scale; and already the whole of Lancashire, and five-eights of Yorkshire have been completed. Tho expense of the one inch scale, as compared with the six inch scale, is represented to be as one to four. It will consequently take four times as long to execute the survey with the grant continued at the rate it now is of £60,000 a year; the delay, or acceleration of the work, being altogether a question of money.

Look at this enormous expense of $300,000 per annum for mere surveying, yet we believe, that in a scientific point of view it could not be spent to a better purpose.

Blowing up Wrecks by Electricity.

The wreck of tho Illinois steamer near the wharf at New Orleans has been removed by blasting, using the galvanic battery. A tin cylinder containing a large quantity of powder was let down on the side of the bow, and drawn toward the other, until it was deemed far enough placed beneath the bottom of the wreck to produce, by its explosion, a powerful and immediate effect. As the means before adopted to fire the powder, when thus placed, had proved insufficient, the attention of the gentlemen superintending the work was drawn to the use that might be made of a galvanic battery, and wires attached, to effect the desired object. A battery of eighteen or twenty jars was brought to the spot, the cylinders with the wires from the battery being attached to it, filled and sent down, and soon, upon a slight gesture from the operator, the electric fluid darted down the metal, sped on its destructive errand, a dull heavy sound stunned the ears of those standing near, a volume of water, like a column, rose twenty feet in the air, and when it fell, the workmen sprang on the floating stagging the diving bell plunged into the foaming current, and in a short time all hands were busily engaged in hauling up large pieces of the shattered wreck.

Dr. Franklin.

It is related of Dr. Franklin, that once while in France he had a dispute with a nobleman upon the question whether the majority ought to rule in State affairs, or whether the educated and well informed few should govern. The nobleman advocated the latter proposition, and Dr. Franklin defended the former. After some debate, the nobleman proposed to let the matter be decided by the company present, and being surrounded by his own friends, they all rose at once on his side and left the Doctor alone. "Well," said he, "according to your own principles, I have gained my cause: you represent the ignorant majority, and I, the wise minority, decide that you are wrong and must yield."

Discoveries in Ancient Nineveh.

Letters have been received from Dr. Layard, dated Mosul, October 15, at which place he arrived on the last day September. Dr. Layard intended to recommence his excavations, on the scene of his former labors, as soon as he should be able to assemble his Nestorian diggers from the mountains. At present the country is in a very unsettled state; it is scarcely safe to venture out of the city gates. At the date of his letters he had about sixty workmen exploring the ruins; and many bas-reliefs—of which the store seems inexhaustible—were discovered. But all had suffered from the effects of fire,—and they will scarcely bear removal. Of these accurate drawings will be made by Mr. Cooper the artist attached to the expedition. Amongst the bas-reliefs most recently discovered by Dr. Layard is a representation of the removal of one of the gigantic bulls,—showing that they were sometimes, if not always, removed to the palace after being carved. An immense number of men draw a sledge which runs upon rollers; impetus being given to it behind by an enormous lever worked by cords. A cast will be made of this curious subject in the event of its being impossible to remove it. It is probably that the fine pair of colossal lions still standing at Nimrud will be moved during the present expedition. Dr. Layard paid a second visit to the periodical festival of the Yezidi, or Devil worshippers,—and was admitted to all their ceremonies. On this occasion he also saw the celebrated Melek Teou, the bronze bird, the existence of which has been a matter of speculation to travellers, and which he described as a very curious relic. Of these and other matters we may, it is to be hoped, expect full particulars in a second series of "Nineveh and its remains."

British Mechanics Association.

In an article in the Literary World by J. B. Bartlett, it is stated that mechanics Institutes prevail to a considerable extent in Birmingham, Manchester, and other large towns. Although professedly formed for working people, but few of this class are able to join them in consequence of the expense, small as it is.—They are supported chiefly by the middle classes, and by the higher order of skilled artisans. Attached to the Institutions are libraries.—Some of them have lectures, debating clubs, and improvement classes besides. In Yorkshire they are all associated into a body called the "Yorkshire Union." This embraces seventy-nine institutions, and twelve more have asked for admission. The total number of members is about 16,000. The average number of books in each library is about 900. The Mechanics' Institute at Liverpool has 3,233 members; the two at Manchester together about 4000. It is believed that the total number of these Associations and Scientific Societies, large and small, in England and Wales, amounts to four hundred.

In Birmingham cheap subscription rooms have been opened, which are so crowded that all cannot gain admission who apply. In London no provision is made by which working men can get access to books, in the public libraries, as they are closed before the hour when they can read. If they want to read a particular book they must buy it, unless they can find it at one of the coffee-rooms.

The cultivation of a taste for reading soon creates a desire for better books, and the cheap trashy stuff is trown aside. Some of the most intelligent and best read in Birmingham are working men. This class of people write a great deal of poetry (such as it is,) and contribute much solid matter to the newspapers. Three prize essays on the observance of the Sabbath were lately gained by working men in Birmingham.

The system of lectures which has been tried at the Mechanics' Institutes has had a beneficial effect upon the people, as well as upon the institutions."

[It seems that Birmingham, for some reason or other, is singled out as a model of genius and learning for working men. But it certainly would be mortifying to all Britain, if out of more than 1000 essays, the three prizes were taken by Birmingham men, but it was not so. The above is incorrect, without excuse, for one prize only was taken by a Birmingham man, a foreman printer; the second by a shoemaker in Roxburyshire, and the third by a Dundee machinist. England did not match the north, it seems, in this contest, although she did well—the essay of John Allan Quinton, (a good old Saxon name) of Birmingham—"The Workingman's Plea for the Sabbath," is a production of which any man might be proud.

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New Inventions.

For the Scientific American.

Railroad Accidents.—A Suggestion.

Very many accidents, attended with loss of life, happen every year on our Railroads, and for the purpose of illustrating my ideas in this communication, I divide them into two classes, viz., those that happen to persons who are run over, who may be on the track in advance of the train, and those that happen to individuals on the train, or, may be, at the side of it. A numerous portion of the latter class are by reason of persons falling between the cars on to the rails, and those who may be on the outside of the rails (perhaps in haste to get on board,) accidentally stumbling and falling across the rails; the result in either of the two cases of the latter class named above is a terrible death.

What I would propose as a safeguard, for the prevention of accidents, and death to those who may be on the train and fall between the cars, and to those who may be on the ground outside of the track, to prevent their falling on the rail by stumbling, or otherwise, is simply this :—I would in the open space, between the tracks of a car, and in the open space between two cars when attached together, make a partition (I call it a partition for want of a better term) which would close up the space between the rails and the body of the car; this partition can be easily made and might reach nearly down to the rail, and being directly above the rail and in the rear of the truck, would not come in contact with any thing near the rail. This partition of one car, and the partition of another, when two cars are attached together, would meet each other and thus form a perfect and continuous guard from one end of the train to the other, against the class of accidents I have adverted to. One life would have been saved on the Manchester and Lawrence Railroad, on the 15th of Dec., had there been a guard of this kind. PRECAUTION.

Improvement in Gold and Silver Pencil Cases.

It will be observed on our list of patents this week, that one is granted to Mr. Albert G. Bagley, New York, the celebrated gold pen manufacturer. We have seen his invention, and consider his pencil cases (his pens need no recommendation) to be the neatest in the market. Mr. Bagley has a very fine mechanical mind and exquisite taste. He is always getting up something new and good, and the patent just issued combines one of the most original and uncounterfeitable inventions in its line that has yet been brought before the public.

Propeller for Canals.

Mr. Joseph Grant, of 138 High street, Providence, R. I., has invented a propeller for canals to prevent the washing of the banks, which presents some good features. He employs a tube or tubes rnnning the entire length of the vessel, and places a screw in the after part of said tube or tubes. The water comes out behind without creating any side surges, and the vessel is very compact and snug for entering locks. He has taken measures to secure a patent.

Machine for Repairing Roads.

Mr. N. Potter, of East Hamburg, Erie Co., N. Y., has invented a machine which removes heaps on the sides of ruts, and fills them up at the same time. It can also plow up high places or heaps on the road, and by back moveable scrapers, the dirt can be directed to the middle or from the middle of the road. It is drawn like a wagon and is otherwise very simple.

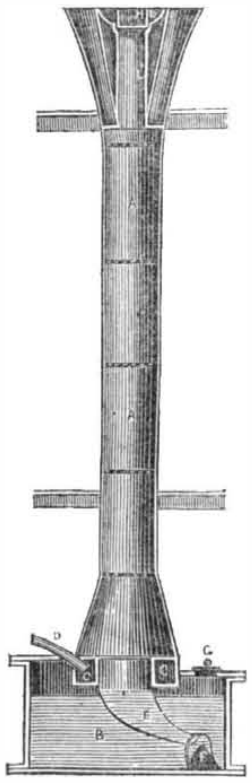
Measures have been taken to secure a patent.

New Rotary Engine.

Mr. George Creary, machinist, of this city, has invented an improved rotary engine, which is said to remove all the decidedly good objections made against the other engines of the same class. It works on the expansion principle, and it takes in the steam at two opposite sides, and does not work the valves as is commonly the case, by the pistons.

New Way to Manufacture Shot.

It is well known that for a number of years past, all our shot for fowling pieces has been manufactured by dropping the molten lead a great distance. For this purpose tall towers were erected, as ably treated in an article in the Franklin Journal, by Mr. Ewbank. The present invention, which has been patented both at home and abroad, by Mr. David Smith, of this city, is designed to make the shot in any building, to obviate the necessity of using tall towers; and it will be seen that the principle of the invention is founded on scientific principles, and is highly ingenious, and consists in driving a current of air in a contrary direction to the falling lead, which combined with the velocity of the falling lead from a low height (about 50 feet) will cool the metal as well as if it fell from a great height; the velocity, according to the size of shot desired, being the cause of this. This cut is an elevated section of the conduit passing through two floors of the building.



A A is a vertical metal tube, about 20 inches in diameter. The lower end of the tube is a truncated cone, which rests on a water chamber, B. C C is an annular chamber. The upper surface of this chamber is perforated, through which air is admitted to the body of the tube, A, the air being forced in passing through the tube D, by a blower, to give the air the required velocity in the tube. E is a shute to guide the shot into the box, F. G is a place to remove it. The shot drops down the tube, A, and passes through the water into the chamber, F. The upper part of the tube has a trumpet mouth, to allow the air to pass freely out at the widest part. H is the pouring pot, resting over the concentric chamber, L 1, which is supported by six arms, secured inside on the tube, as indicated by the diametrical flange at the bottom of the enlarged part above. The pouring pot has a perforated bottom to diffuse the molten lead over the area of the channel, L 1, and L is a spill chamber to receive any lead that may run over, not to let it go down the tube. The metal thus falling must have an upward current of air that will meet the lead with a velocity, for the short distance, equal to that which the shot meets the air in the great distance through which it falls in high towers. By increasing the current of air, an equivalent for any fall may be obtained.

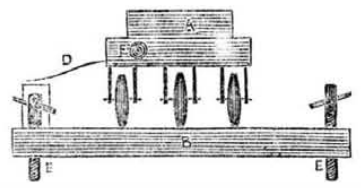
Shot by this process is now manufactured in Water street, this city, by Messrs. Thos. O. Le Roy & D. Smith. The machine is in perfect operation, and makes far better shot than by the old high tower method; for this reason :—"The shot in falling 200 feet in the high tower, acquires too great a velocity, and they are injured by the force with which they strike, while in the new method, the shot is supported by the ascending current."

This is one of the most original and best inventions that has been brought forward for a long time, and as in a great number of such cases, the inventor possesses a real modesty and quietness regarding his invention.

For the Scientific American.

Action and Re-Action.

FIG. 1.



One of our popular works on Natural Philosophy says, "A man in a boat, pulling a rope attached to a large ship, seems only to move the boat, but he really moves the ship a little, although its velocity is as much less than that of the boat as its weight is greater." That is, the velocity of the two bodies thus put in motion, will be inversly in proportion to their weight. This is doubtless a deduction from the position that action and re-action are equal. It is not my present object to determine how far this consequence is deducible from the premises, nor to contend with theories; but I shall endeavor to test the effects of forces thus exerted in practical application.

A*	12	*g*,	12	*D
B*	12	*h*,	6	**E
C*	12	*i*,	3	****F

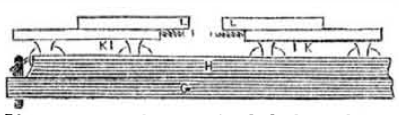
Let A B C and D represent four equal bodies, each of whose weight shall be indicated by 4, and let E and F increase in a two-fold ratio; then E will be 8 and F 16. Let the distance A D be bisected by the point *g*, making each part 12; and let the distances between B and F, and between C and F, be 12+6 and 12+3, as above indicated, making the distances from the central points, *h* and *i*, inversely in proportion to the weight of the respective bodies.

Then a man standing on D, and pulling a rope fastened to A (the weight of D being still 4, with the man included) will, with a certain force, cause both bodies to move equally, and arrive at the same time at the point *g*, their resistance being equal. Then agreeably to the theory before us, the same force applied in the same manner between B and E, will bring them to meet in the point *h* in the same time; or if the same force be applied in the same way between C and F, they will meet in the same time in *i*, and the product of the respective weights and distances of the several bodies will be expressed thus :

$$4\times12=12\times4$$
$$4\times12=6\times8$$
$$4\times12=3\times16$$

Now there can be no question but that a man standing on a fixed object at *g* must exert a force of $4\times12=48$, to draw the body, A, to him in the same time that was required to bring A and B to that point in the former case. The same force will be required at *h* to bring either B or E to that point, or at *i* to bring either C or F to that point.

FIG. 2.



If a man stands on a fixed body and acts upon a moveable one with a given force, his effect on the moveable body will be greater than can be produced by the same force when the operator stands on a body that is moved more or less by the application of that force. But in the illustration, a man standing on D, and exerting a given force, draws A towards him, and at the same time moves D with the same velocity; but when he stands on E and uses the same force he moves E with less velocity than he did D, or (as our theory says) with but half the velocity of D. And again, when the operator stands on F, exerting the same force, he moves F but one-fourth as fast as he did D, yet in these several cases he is supposed, according to the theory, to move A B and C equally, notwithstanding his giving to the body on which he stands four times as much velocity in the first case as in the last.

For the practical illustration I have prepared apparatus, consisting of two cars placed in a horizontal table, with adjusting screws for leveling. Fig. 1 is an end view of the table, showing one car on it; A is the car with three wheels, two at one end and one at the other; B is the table: C is a raised ledge on the side of the table, on the upper surface of which is marked a scale of inches and tenths, pointed to by the index D to show the distances moved by the cars; E E are screws for leveling the table; F is a spiral spring projecting from the car so as to press upon the corresponding part of the opposite car. Each car has such a spring; so that by these they mutually repel each other when pressed together.

Fig. 2 is a side view of a part of the table with the cars on it; G is the table; H is the raised ledge, hiding parts of the car-wheels, I I are the spiral springs; K K are the indices; L L are projecting parts of the cars, to be brought in contact when the springs are sufficiently compressed for action.

When these projecting parts of the cars are brought together; they are held in that position by a clasp, which may be detached without giving any impulse to the cars, only setting them free for the action of the springs. The cars are 7 inches long and 3 wide, weighing 10 ounces each; but a small part of the table is shown in the figure. It should be four or five feet long. When the table is properly leveled, and the cars pressed together and clasped, they are prepared for experiment. When prepared in this way, on detaching the clasp each car ran 13.7 inches.

On putting 5 oz. on one car, so as to make it 15 oz., the loaded one ran 7.3 inches and the light one 16.5.

When the load was 10 oz., making with the weight of the car 20 oz., it ran 5.3 inches, and the light one 18 inches. When increased to 30 oz. it moved but 2.8 inches, while the light one moved 19.3 inches. When I placed a heavy piece of iron behind one car to prevent it from moving, the other being light, ran 27.5 inches, and when loaded to weigh 20 oz., it ran 15 inches. SILAS CORNELL.

F. Y. M. B. School, Providence, R. I.

[We will give the experiments in a tabled form next week.

Naval Science.

Commander Jerningham of the British Navy is concentrating the broadside of the ship Leander. The object of this is to ensure the certainty of the delivering the first broadside with the most deadly effect; the whole of the guns should be fired simultaneously or the smoke from a single gun would obscure the object at the moment the others are to fire; and after the smoke has rendered everything invisible from between decks, the only chance of getting a sight of the enemy is from the upper deck, or aloft, as long as the masts are left standing. Captain Jerningham's plan, therefore, which was satisfactorily proved on board the Wellesley in India and in China, in 1837, and on board the the Excellent in 1847, is one that may be adopted in every ship without any additional fittings, and that in a few hours. The guns may be brought into position to cover a horizontal line varying in length from one inch to fifty feet, at any distance up to six thousand yards within the angle of training of the guns in the ports, and the fire repeated with the same precision and rapidity as is now done with the single guns.

Improvement in the Manufacture of Velvet.

A manufacturer in Lyons, France, has commenced to make both plain and ornamental silk velvets of three yards in width. The quality is said to be equal to the present narrow web. We have doubts regarding the possibility of making such wide goods, of equal quality with the narrow.

Improved Hot Air Engine.

We learn by the Philadelphia News that Dr. Evan J. Pursey, of that city, proposes to construct an engine to be propelled by heated air, which combines many advantages over engines of this kind that are in use at present. The project, we have heard, has occupied the attention of the Dr. for a long time.

An artesian well was sunk in Leicester Square, London, lately, and a continuous stream poured forth to supply Buckingham Palace, &c.

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Scientific American

NEW YORK, JANUARY 12, 1850.

Reading during the Winter Evenings.

It is well known that our youth, especially in our rural districts, have more leisure during the winter season, than any other. The question, "how shall it be spent most profitably?" we believe, is seldom asked. We are sorry to know that so many spend it in vain idleness. It is too common a practice to kill time by telling and hearing unprofitable stories in favorite places of resort, or idling it away in low pleasures. The ball room receives far more countenance from our youth than the lecture room; and the novel more attention, than a good work on some useful subject. Some say that it is owing to the dryness of the subject in both cases, or the manner in which they are treated, that the useful is neglected, and the attractive but vain, preferred. There is truth in this in some cases, but not always. Some treat religion as if it were a system of mental excoriation, and some authors who write on useful subjects, treat them in such a staid and dull manner, that we are often tempted to believe they wish for the fame of great learning by writing in a style which they neither understand themselves, nor any other person. Some such authors may well depart exclaiming like the German philosopher, "I am dying, and there is but one man who understands my writings, and *he* very indifferently." But all these things do not even furnish a grain's worth of sense to any excuse for not spending time to some useful purpose. We do not mean to say a word against rational amusement—we believe with Solomon, that there "is a time to laugh and a time to sing." What we find fault with, is the contemptible, foolish and unambitious way in which some young men spend some of their spare hours. In our cities they are worse than in the country, for the fact is, our best men (not all however) are imported from the rural districts. It is quite a common thing to find great numbers of our young men, perfectly ignorant of the first principles of natural philosophy, and barbarously in the dark about the history of their own dear native land. This should not be. "Then what is the remedy?" some will say. We can say this much, "We never saw a man possessed of much knowledge, who was not an attentive and studious reader, and took pleasure in reading. On the other hand, we never saw an ignorant man who was an attentive and studious reader. A person to be well informed must read well: that is, read and study good works. A man or woman might read novels (with but few exceptions) till doomsday, and yet be very ignorant. When a passion for light reading is formed, it is very difficult to acquire a taste for solid reading. We can only advise the formation of a stern resolution, to break the one and acquire the other. Let a good book be always at hand, and when there is a moment to spare, oh young man, give it attention. Courage and perseverance will surmount a thousand difficulties.

We knew two young men who worked at the same bench, and both walked in the same sphere. The one was desirous of being something—a character—and resolved on sacrificing present vain pleasures to acquire knowledge. The one who had the ambition wished the other to attend the Winter Evening School with him, and the answer he received was, "I am going to a ball: I can get along without the education you speak of, as others have done." The retort of the other was, "So could I, but I wish to be what *the* others you speak of, are not, and which I never can be without a good education." These two young men are still living—the lover of ignorance is a tradesman with a very indifferent reputation and poor wages, the other is now an author of some celebrity.

Young men, whatever others have been, you can be, but not without effort—continuous, unwavering effort. Without this you may as well expect to be intelligent men, as to expect that the husbandmen could reap his fruitage without sowing, or the red hot bar assume form on the anvil, without repeated blows of the brawny blacksmith's hammer. Some may ask, "What shall we read?" There is no use for us to tell you what to read, only read good books; and if you want to learn the principles of science, commence at the root of the matter, by studying elementary works. Always commence at the foundation; if you do not do so, you may expect to be as satisfied with your future progress, as if you were to commence a book at the end and read straight on in the wrong direction, to the beginning.

Spirit Drinking in Great Britain and Ireland.

The Washington Globe, copying our article on this subject, (which appeared two weeks ago in our columns) says that we did "injustice to the Scotch, not from design," but because we omitted to take into consideration the amount of beer drank in England. Our censure of the Scotch clergymen, the Globe thinks, "was not merited." As this is a subject connected with the physical welfare of our fellow men, we can justly say a few reasonable things about it. We did not use a single word in the article referred to, without weighing it well. We do not think that we were unjust in any of our remarks: we believe that we spoke the truth, but there may be an honest difference of opinion respecting the manner in which we expressed our opinions. The Globe refers to the huge breweries in England, which the Editor has seen, but also states that there is much whiskey drunkenness in Glasgow, &c., in Scotland, and thinks that some of Burn's songs have a pernicious effect upon the customs of the country. We have also seen these things, and lamented over them. It would be far better for the Scotch, if they must drink, to quit the whiskey and drink beer like the English. There would not be half as much drunkenness, and certainly far less injury to their brawny bodies.

We are glad to perceive by our late exchanges from Scotland, that some clergymen are taking measures to do something in arresting drunkenness. In Edinburg, the United P. Presbytery have adopted measures to proceed against any member who sells liquor on the Sabbath. So far so good, but what is this to the good they can do, for there is no class of clergymen that are socially so much one with the people, yet so generally respected and command a more intelligent influence. It was stated at a meeting of the Presbytery referred to, that 23 houses out of 27 open for the sale of drink on Sabbath, were kept by people in connection with the church. Our information upon other points is very minute. We would like to do good, if we can, and our voice may not be in vain to some one across the mighty waters. The Scottish clergy should try to abolish all the evil social customs that lead to inebriation. It is not enough that "they do as much as the clergy of England or Ireland," as the Globe says; we want them to do more than they have done, for "to him that knoweth to do good and doeth it not, to him it is sin."

To add strong testimony from head quarters, to prove the veracity of our former statements, the Glasgow Examiner of Dec. 8 (received by us on the 29th ult., after we wrote the article mentioned) says, "England and Ireland are bad enough, but Scotland seemingly hastens to be a nation of drunkards." This is an editorial extract. The Globe must give us her support to say a good word to arouse the land of Watt, Burns and Scott, from the fearful pit into which she is fast falling, and the way to do this is to arouse her clergymen to a sense of what *they can do.*

Question.

A correspondent wishes to enquire of T. B., whose communication appeared in No. 11, in regard to the Iron Manufacture, "Whether, in his experience, the blast entering a charcoal furnace should be limited, either in quantity or pressure—if so, what is the limit?"

The Properties of the Crank.

Owing to the crowd of more important matter, the second article on this subject is left over till next week.

We have several good communications which have been filed for insertion. They will appear as fast as we can make room for them.

To Color Sheep Skins for Door Mats.

(Concluded from page 125.)

YELLOW.—Having prepared the skin as described on page 125, the dye vessel is to be prepared with a strong solution of yellow oak bark (to be found at any druggist's.) This bark must be first scalded with boiling water and the clear liquor only put into the dye kettle. One pound of bark should dye one skin. Use half the scalded bark liquor at first, and along with it put in a quarter of a pint of the muriate of tin. This is muriatic acid or spirit of salt in which tin has been dissolved.—When the liquor boils enter the skin (mind the former directions) and let it get the boiling bark dye for about ten or fifteen minutes; then take it out and air it. After this put in the rest of the scalded bark liquor, which can be kept in a small vessel, or pail, and put in a little more of the muriate of tin, and then let the skin, or rather the wool on it, get another 15 minutes' boil. It will then be a good yellow and a fast color.

ORANGE.—By adding a little ground cochineal and a little cream of tartar to the dye kettle, along with the yellow oak bark, a beautiful orange will be made on the wool of the skin. These skins should be washed afterwards and treated exactly as we described in our last. A good looking yellow may be made by using turmeric and a little vinegar or vitriol, to make the liquor sour, instead of the yellow oak bark, but turmeric is bleached out by the sun in a very short time.

RED.—For one skin take one pound of red wood. It is known by different names, such as Nicaragua, hypernic and peach wood. Boil this dye wood for half an hour in a tin kettle, and then let the grounds settle; take the clear and put it into the broad dye kettle, which must not be of iron. Then put in a piece of alum about one half an ounce and let the liquor boil; then put in the skin and let the wool get the boiling dye for about half an hour or more. It will then be a deep red:—wash and dry.

SCARLET.—Boil one ounce for one skin of ground cochineal and a little yellow liquor in the flat dye kettle, for 10 minutes, and then put in one ounce of cream of tartar, and half a tea-cupful of the muriate of tin. Now enter the skin and let the wool get the boil of the dye for one hour. By adding cochineal it can be made as deep and rich in color as is desired. This is a most brilliant color, but the wool must be perfectly white before it is entered in the kettle. Wash and dry.

CRIMSON.—This can be made with cochineal, dyeing it like scarlet, only giving it no yellow liquor, and after it is dyed it should be kept for 15 minutes in a vessel of warm water, in which has been dissolved a very small quantity of saleratus or soda. Then it should be well washed. Peachwood makes a very good crimson, also, and is cheaply and easily dyed, but the cochineal makes the *ne plus ultra* of red colors on wool and silk.

PINKS—Can be dyed like the crimson, only not so strong dyes are used—this is all.

PURPLE.—Scald about one-fourth of a pound of ground log wood, or take the liquor of boiled chip logwood and put it into the flat dye kettle, then add one-quarter of an ounce of cream of tartar, a very little alum, and about 60 drops of the muriate of tin. Let the wool of the skin get the boil of the dye for about three-quarters of an hour. Then wash and dry.

We have now described all the colors used for lamb-skin door mats. Before dyeing they must be perfectly clean and white, except for the green—the wool need not be white for it. The colors can always be deepened by adding more dye-stuffs. If the colors look watery, they want more dye stuffs. Woolen cloth, wool, and yarn can be dyed with the same receipts, only they are not handled like the skins. The wool is put in bags, the yarn turned on pins, and the cloth dyed on a revolving reel. Any one can dye their own door mats if they follow the directions given.

English Piracy of Inventions.

A late number of the Scientific American contains an engraving and description taken from the London Patent Journal, of "Andrew Shank's invention for Moulding Iron Pipes without Cores." This is adding another to the long list of American inventions pirated in England; and as you have contributed to expose a goodly number of them, I shall be happy to avail myself of your columns to give the facts of the present case, all within my own knowledge or derived from unquestionable evidence. I do this as a simple act of justice to a worthy man, having no interest whatever in the patent.

For this beautiful invention we are indebted to Mr. Thos. J. Lovegrove, of this city. The idea of casting pipes by centrifugal force was first suggested in the summer of 1847. In December the patterns were prepared and the first rude attempt made in February, 1848. Although defective in many particulars, yet enough was shown to prove the principle correct, and that perseverance alone was wanting to insure success.

Further experiments were made, one difficulty after another removed, until in August he applied for a patent, which was granted Dec. 26, 1848.

In September it was exhibited at the Fair of the Maryland Institute, and excited much attention. The following report of the Committee shows with what result."

Here follows the Report, which is too long for us to publish, but we will give the substance of it. It is a certificate of the Board of Managers of the Maryland Institute, given in Baltimore, Nov. 26, 1849. It states that Mr. Lovegrove exhibited his machine at their Annual Fair, Sept. 1848, and that it was for "giving form to metalic substances, while in a liquid or molten state, by centrifugal force of a revolving mould." This shows that as early as Sept., 1848, Mr. Lovegrove not only had invented but constructed his machine—identical to the one described by us, and to which our correspondent refers. The certificate is signed by Messrs. C. W. Bently, Jas. Murray, Robert Eareckson, and Isaac Brown.

The President of the Croton Aqueduct Board, New York, gives a certificate, dated April 28th, 1849, stating that he had tried pipes cast by Mr. Lovegrove's machine, with a pressure of 300 pounds to the square inch, and the result was satisfactory.—ED.

"The East Boston Iron and Gas Co. are now erecting works for casting on this plan, and in two or three weeks will be in operation. Greenwood & Ceriton, of Cincinnati, will also soon be at work.

When it is known that a pipe 4 inches diam. 9 feet long, can be cast complete in three minutes, and at a cost less than it requires to clean one after the old method, you will admit that it must supersede it.

It is evident from the engraving that Mr. Shanks must have got his ideas from the earlier stages of Mr. Lovegrove's invention, of which it is a pretty exact resemblance. His flask is one piece, so was Mr. L.'s, but he soon found this to be impracticable, and now it is divided longitudinally, with a very ingenious method of joining and separating instantaneously. FRANCIS H. SMITH.

Baltimore, 2d Jan., 1850.

[We would state here that it not unfrequently happens, that two inventors living at a great distance apart, produce like inventions abont the same time. This may have happened in this case, and it may not; but such things happen very often, and we have, in our capacity, frequent occular demonstrations of the fact. But this is a case which evidently appears to be altogether in favor of Mr. Lovegrove as the original inventor. We would state here, that if an American Inventor wishes to secure a patent in England, he should mind what he is about, and apply for it before his model goes to Washington—and if he cannot pay for an English patent, and does not care about one; but, as is natural, likes not another to claim the honor, he should get an engraving of his invention published in the Scientific American. It is looked upon in Britain as the Repertory of American Inventions. We intend to advocate a reform in the British Patent Laws, for the better protection of foreign inventors, and the British journals are with us; heart and hand, and we have no doubt but in a few years our inventors will see a good reform made, both in our own and the British Laws, for the benefit of inventors.

—EDS

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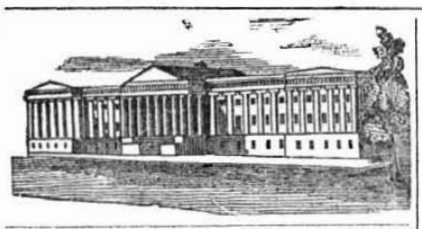

LIST OF PATENTS CLAIMS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending January 1, 1850.

To Albert G. Bagley, of New York, N. Y., for improvement in Penand Pencil Cases.

I claim the auxiliary interior tube, in combination with the two outside tubes, and in the manner substantially as herein described, and for the purpose set forth.

To James M. Clark, of Lancaster, Pa., for improvements in combining Grinding and Bolting Machines.

I claim the combination of an adjustable grinding mill, with an adjustable bolting machine, both worked on one shaft, and adapted to each other, so that both or either, can be adjusted, substantially in the manner and for the purpose above made known.

To Ashley Crafts and Ebenezer Weeks, of Auburn, Ohio, for improvement in instrument for paring horses' hoofs.

What we claim is the combination of the gripe, the arm and knife, whether made with or without the adjustive plates and joint pin, or in any way substantally the same, and of any suitable size and material.

To J. Crane & F. H. Hamilton, of Schenectady, N. Y., for improvement in Hemp Brakes.

What we claim is the combination of the revolving rollers, with the swords or beaters arranged and operating substantially in the manner herein described.

To C. O. Greene, of West Troy, N. Y., for improvement in Coal Grates.

I claim the formation of a revolving cylinder grate by placing circular grate bars or flanges around a hollow cylinder, a draft of cold air being passed through the said hollow cylinder for the purpose of cooling the same, at the same time making it answer the purpose of a hot air chamber, substantially as above described.

To R. B. Goodyear, of Philadelphia, Pa., and Benj. Hirst, of Manyunch, Pa., (Assignors to Alfred Jenks, of Bridesburgh, Pa.,) for improvements in operating shuttle boxes in looms.

We claim, first, shifting a series of shuttle boxes, substantially as herein set forth, by means of a corresponding series of cams, acting through levers, or other means, severally brought into action at the required intervals by the pattern wheel face cam and spring or other equivalent devices, the whole arranged and operated substantially as described.

To F. H. Hamilton & Thos. Bullock, of Schenectady, N. Y., for improvement in Hemp Scutchers.

We claim the combination of the circular back or head, with the inclined knives or scrapers, and the hub and rest, substantially as is herein mentioned.

To John Kimball & H. Rice, of Concord, N. H., for improvement in connections of brakes with cars.

We claim the enclosure of said link or pin in a tube, coating or lining of india rubber or other elastic substance, and securing said rubber in a box or casing so as to confine the same permanently in such way as to allow the action of the brake or other machinery, without wear or friction, rattling or noise.

To R. Mareau, of Lawrenceville, Pa., for improvement in Washing Machines.

I claim the combination of a bed of rollers moving at different velocities, with a compressor for the purpose of washing, rinsing and wringing clothes, substantially as herein set forth.

To Wm. Maguire, of Cincinnati, Ohio, for improved blind shutter mover and fastener.

I claim the combination of the finger and wheels (two) with the gravitating catch, its recess, spring and hook, for moving, fastening and unfastening the blind.

To John Rogers, of Orleans Co., Vt., for improvements in the wheel and axle stump extractor.

I claim the arrangement and combination of the axle or journals of the wheels, and the axle or journals of the windlass barrel of a stump extracting machine substantially in the manner and with respect to the bed frame and other parts of the machine, as herein before specified, the same being for the purpose essentially as above set forth.

To F. Slaughter & D. Perry, of Fredericksburgh, Va., for improvement in machinery for making Cotton Cordage.

We claim, first, the improved form of the nipper heads, when the nippers are combined therewith by means of the steadying pins, projecting from the inner edge of the nippers into guiding holes, in the nipper heads, and by suitable actuating springs, or their equivalents, substantially as represented and described; by means of which the nippers are prevented from becoming clogged and obstructed in their movements, and from pressing against the slivers by the accumulation of trashy matter about them.

2nd, In combination with the planetary motion of the series of flyers that receive and twist the cotton slivers and lay the threads formed thereby into a cord or rope as described, we claim the independently moving and self-adjusting compressing forming block, for giving a round and perfect form to the cord, or rope, (after its component threads have been laid together) substantially in the manner herein set forth.

To L. Stark, of Chicopee, Mass., for improvement in Branding Tools.

I claim the combination of the inner with the outer shell, substantially in the manner described, as applied to the branding tool.

ADDITIONAL IMPROVEMENTS.

To H. B. Masser, of Sunbury, Pa., for improvement in Ice Cream Freezers. Patented Dec. 12, 1848, improvement added Jan. 1, 1850.

I claim by this additional improvement, the spring blade or scraper, constructed and employed as above described.

RE-ISSUES.

To R. S. Stewart, (Executor of Geo. Law, deceased, Assignee of Moses Chase, deceased,) of Baltimore, Md., for improvement on the carding and spinning machines, denominated the Card Spinner, for manufacturing yarn from two or more different materials at the same time. Patented March 23, 1842. Re-issued Jan. 1, 1850.

I claim the combination by which the said composition thread or yarn is produced as above described, consisting of the delivering rollers, between which the covering material and the thread to be covered come in contact, as described, combined with the said doffer, the cylinder, the spindle for twisting the thread while it is in contact with the covering material, and the spool supplying the thread to be covered, all as described and represented in this specification, and the accompanying drawings or their mechanical equivalent in like combination and for the purpose set forth.

To Z. C. Robbins, of St. Louis, Mo., for improvement in Churns. Patented June 1, 1849. Re-issued Jan. 1, 1850.

I claim the series of parallel floats or beaters, formed and arranged within the agitator, substantially as above described, so that when their motion is reversed, their thick inclined rear edges will gather the butter into a roll in the centre of the agitator, substantially as herein set forth.

Report of the Secretary of the Interior about the Patent Office.--Extracts.

The Capitol and Patent Office Moulding Away.—The Capitol is a massive building, its walls are thick and maintain a certain equality of temperature, changing slowly with the changes in the temperature of the air. In a change from cold to warm, the walls remain for a time cold, and there is condensed upon them a portion of the moisture of the atmosphere, as upon a pitcher containing ice water in a sultry day. The stone being very porous, readily absorbs the moisture, and the natural cement which seems to be slowly soluble in water, is dissolved or otherwise loses its adhesive power, and the stones crumble to sand. A thick coat of paint, carefully applied from time to time has been resorted to to preserve, and no doubt tends to preserve the building; but unless some other and more permanent protection he resorted to, it is destined to early dilapidation. If left wholly unprotected from atmospheric action for one-fifth of the time that marble structures are known to have stood, this noble edifice would become a mound of sand.

The Treasury building and the Patent Office building are of the same material, and, having been in no manner protected show signs of decay. The cornice of the Treasury building, which exposes a heavy mass of stone to atmospheric action, begins to be moss-grown; and pieces of the molding of the Patent Office building have crumbled and fallen. Besides its tendency to disintegration on exposure, the stone in its best condition is weak, offering little more resistance to a crushing force than common brick. These buildings cannot, with all possible care, be long preserved by the means at present adopted. But if the stone as it stands in the walls could be rendered permanently and absolutely impermeable to moisture, the principal difficulty would be removed; and this may perhaps be done by some means known to the arts, or which may be discovered by experiment. For this purpose I would recommend that specimens of the stone be carefully analyzed, and that a series of experiments be tried, with a view of finding some chemical agent, the application of which will prevent its absorption of moisture, and thus strengthen and render it durable.

In consequence of the defective quality of this stone, and of reports from committees of Congress in 1837 and 1839 condemning it, I thought proper to direct that the wings of the Patent Office building should be constructed of a different material. After full consideration a white marble, from a quarry in Baltimore county, Maryland, was selected. It is a strong stone, resisting about three times as great a crushing force as the sandstone of the front building. All the practicable tests which were applied show it to be durable. It is a material of great beauty and it will be easier to make the front building correspond with it in color, than with the gray gneiss, or any other strong and durable stone of mixed or varied colors which could be readily procured. The work on the eastern wing is considerably advanced. Something has been done on the foundation of the western wing; but the whole appropriation has been expended, and it is important to the progress of the work that a further appropriation for its continuance be made at an early day.

The Patent Office Business.—The Patent Office marks the progress and collects the results of the inventive genius of the American people, is an object of increasing interest and importance. The skillful and ready application of the accumulated stores of human knowledge, especially in the natural sciences, to the wants and purposes of man, is a distinguishing characteristic of the present age. Not but that the discoveries of science are pressed as vigorously and with as great intellectual power in this as in the past but the present is especially marked by the practical application of everything known, and which becomes known, to the daily wants and uses and purposes of life.

In this noble struggle for the earliest attainment of the useful in the arts; this pressing forward to the amelioration of the condition of man, the increasing of his comforts and lessening his toils by the application of science to the improvement of his industrial pursuits, that country will be foremost in which enlightened mind is most generally and most immediately brought into contact with operative labor.

It is in that fortunate concurrence of pursuits, where the hours of labor in the workshop are made to alternate with those of study and research, that there are cultivated and matured minds like those of Franklin Rittenhouse, Watt, and Davy, rich in inductive science, and ready in its application to all that is useful or ennobling. Many of the best and ripest minds of our own country belong to this class of operative students, and have long been and are still devoting themselves with signal success to scientific discoveries and mechanical improvements and inventions.

There is, as a matter of course, among the inventions of the day, mixed with the well-directed and the useful, much that is wild and visionary, and therefore abortive, and sometimes, perhaps, the vague, and for the present useless foreshadowing of important future discoveries. But the aggregate value of the labor and study of the class of inventors is beyond all estimate. They have proved themselves benefactors to their country, and are entitled to the especial consideration and care of the Government. The Report of the Commissioner of Patents, which will be presented at an early day, will show a large surplus fund accumulated from their contributions, a part of which was appropriated at the last session of Congress "toward the erection of the wings of the Patent Office building." No part of this addition is considered necessary for the use of that office. Instead of thus directing this fund to a general purpose of the Government, it would seem but just to apply it as the Commissioner recommends, or in some other manner that the wisdom of Congress may suggest, for the encouragement of the inventive arts and the reward of successful inventors.

Agricultural Bureau and the Patent Office.—The agricultural interest stands first in importance in our country, and embodies within itself the principal elements of our national wealth and power; and it should be with us as it has been and is with all other prosperous civilized nations, a leading object of public care and patronage. The principal nations of Europe have their Agricultural Boards, known by various names under the direction of men of high scientific attainments, supported out of the revenues and connected with the administration of the Government. And, to borrow the language of the Father of his Country in his annual message: "This species of establishment contributes doubly to the increase of improvement, by stimulating to enterprise and experiment, and by drawing to a common center the results every where of individual skill and observation, and spreading them thence over the whole nation. Experience accordingly has shown that they are very cheap instruments of immense national benefit."

No direct aid has been extended by our Government to agriculture, except by the yearly collection and publication, through the Patent Office, of some agricultural experiments and statistics and recently the analysis of some soils and vegetable productions. The means thus applied, though useful in their results, are wholly inadequate.

To meet the great object fully, and give to this leading branch of American industry the aid which it so well merits, I respectfully suggest the establishment of an Agricultural Bureau, connected with this Department, but separated from the Patent Office. The expense would be small compared with the end to be accomplished.

[Here we have recommended the separation of the Agricultural from the Patent Department. Our readers will perceive that this is the doctrine we have advocated long ago; we are glad to see this movement. Our agricultural interests are great, to be sure, but the farmer and mechanic are twin brothers, and the interests of the one are no greater than those of the other. What was the cotton interest before the invention of the gin, and it is well known that a country may have climate and agricultural capacities of the highest order, and yet could produce but little—be very poor—for the want of good machines. We have complained that our farmers were treated well, at the expense of our inventors—and the Patent Office reports will show this to be true, and we know our farmers do not want this; but we find no fault with any body but our people themselves, if they do not send men to Congress to *do right*, they cannot be blamed for doing wrong. We trust that Congress will be more mindful of inventors in future, and pay some attention to the suggestions of the last Commissioner of Patents, Mr. Burke. There is one recommendation of Mr. Ewing, which is just and right, but it will be very difficult to work out, viz., "to reward successful inventors,"—that is a delicate question. We will wait for the Report of Mr. Ewbank; it will no doubt be an able and interesting one.

Congress, at its last session, on the motion of the Hon. J. W. Farrelly, chairman of the Committee on Patents of the House of Representatives, inserted in the civil and diplomatic appropriation bill the following item: "Towards the erection of the wings of the Patent Office building, according to the original plan,

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fifty thousand dollars, to be paid out of the Patent fund." It was supposed at the time by the Committee on Patents, and the then Commissioner of Patents, Mr. Burke, that that sum would be sufficient to cover the amount of work which could be done by the next session, when Congress would of course make further appropriations—this sum being used up, we hope that Congress will make the appropriation at once and let the work go on—the money belongs to the inventors.

TO CORRESPONDENTS.

"Subscriber."—We published Roche's Receipt for baking, in Vol. 4, and spoke of it as you now do, at the time.

"J. C., of Baltimore."—It may be as well for you to wait until we get through with our history of Propellers. An oblique paddle is to be found patented by a Mr. Biron, in 1844.—You are right about improvements—we are not at the end. We like every correspondent to state clearly the object he designs to accomplish by his invention.

"E. S. H., of N. C."—We could not tell you about the price of the Sewing Machine to which you refer, (Wilson's.) It would no doubt answer well for the purpose mentioned by you. Mr. Wilson resides in North Adams, Mass.

"J. A. F., of Ala."—Your idea is correct about the rifle, only you must take into consideration the whole weight of the rifle. The principles are clearly illustrated and explained in the work on Mechanics, published by the Society for the Diffusion of Useful Knowledge. Your idea about the Re-action Water Wheel is just and correct, but is understood by Mr. Parker. Your views about the tube and elastic fluid are original to us.

"J. B., of Ind."—The part about the saw mills should have read "like ours." We have seen the ones you allude to in operation. Your idea about the Queen's Ware is correct, but it would never do, you see, to sell it as "King's Ware." We have seen the hydraulic blowpipe, but prefer the one that is in No. 3, Vol. 5, Sci. Am., to any other.

"C. B. H., of N. Y."—Your manner of constructing and combining the boiler, with the engine, to render it portable, appears to us to be new and useful; we know of no other having been constructed like it. We are of opinion that it is patentable.

"J. P., of Ct."—Six cubic feet per second will, on a 30 feet diameter overshot, give thirteen and a little more than a half horse power. For the purpose you desire, you cannot do with less than 14 cubic feet per second.

"J. K., of Pa."—Mr. Bishop, of Ovid, N. Y., patented a wheel which has two sets of buckets, to act as percussion and re-action, but they are placed above one another, and do not discharge at the centre, like yours, but as there are 30 patents on such wheels, it is doubtful if a patent could be secured.

"F. G. W., of Mass."—You will see that the answer has been given about the crank.

"J. A. G., of N. H."—The idea, but not the same way of carrying it out, has been presented to us before. We are of opinion that the plan would be difficult to carry out.

"J. M. H., of N. Y."—Your plan for the cider press could not be patented, because the same arrangement is used for like purposes in other kinds of presses.

"A. G., of Ohio."—We do not see how you could be refused a patent, for your idea is *new*, and it certainly is *useful*—the two essentials requisite to secure a patent.

"M. S., of Ohio."—We have examined your pump and our opinion is not favorable. In all cases we have never seen cog and rack gearing operate well in pumps.

"D. U., of Pa."—We are afraid that no patent except for an improvement on Lull's, could be granted, and then you could not use it except with the consent of the original patentee.

"D. Regr., of Pa."—Mr. Charles Pontez, of No. 71 Cedar street, N. Y., has an apparatus for boring wells, and will soon publish an advertisement. We could not give you the exact information. We do not think he has applied.

"E. C. J., of Mass."—We believe that a pa ent was applied for the same kind of ventilator, about ten years ago. We saw the model and are sure that the ideas embraced were the same as yours. We advise you not to spend any money on a patent.

"Mattewan."—You are right—the Franklin Journal copied it from the Century of Inventions. We shall refer to the work where there is a good treatise on the subject.

"A. C. J., of Me."—Your proposition is untenable; instead of gaining power by such a device there will be a serious loss. Experiments have demonstrated this point fully.

"F. K. B., of Ill"—In answer to yours of the 13th ult., we are sorry to say that Nos. 1 and 2, of Vol. 4, cannot be furnished; we have been out of these numbers for a long time. We make no charge for missing numbers when furnished to subscribers.

"S. H. J., of Mass."—We trust you may realize good results from your experiments, and hope to hear from you regarding them.

"H. D. S., of N. J."—Is informed that his plan for a city railway is not new: Mr. Meigs exhibited the same plan before the N. Y. Legislature at Albany, in 1840, since that time we have heard nothing of it.

"W. N., of Ill."—An engine of 8 horse power, complete, with cylinder boiler, will cost you about $800. $1 received and credited.

"E. V., of N. H."—The principles of your rotary are well understood by us, but they are not new. Some time last year a gentleman from New Jersey exhibited a drawing to us embracing the same ideas, and nearly the same in mechanical construction. We had no great confidence in its success, although it may be made to work.

"J. C. of Ky."—Mr. E. Barlow, of Marietta, Ohio, did obtain a patent for a pump on the 20th of Feb., 1848. Cannot now say whether such a gas as you speak of has been patented or not. Our opinion is that it has not. $2 received.

"F. H., of Boston."—We do not know that any varnish has ever been made, such as you speak of, to resist 200° degrees of heat; but should think that alum mixed with copal varnish could answer—phosphate of magnesia ought also to be good—both substances are good non-conductors, but of the two we should prefer alum, as it is more transparent.

"J. H. H., of Ala."—A small sized force and lifting pump would cost about $6, and lead pipe 20 cts. per foot. The smallest size made by B., are worth $25. We have sent you the back numbers called for.

"D. W. E., of N. Y."—The buckets of Mr. M.'s wheels were not governed by a rack and pinion, but changed their position by their own weight. There would be many objections to laying rails ten feet apart—six feet is sufficient for all purposes of speed, comfort, &c.

"A. W. D., of Ct."—Your plans for a horse power is very simple and practicable—but very old, no patent could be obtained for it; the only point of difference between yours and many others, is simply the application of the extra wheel and a change in form, showing no novel combination.

"J. L. of Ill."—Your favor was very acceptable; accept many thanks for the same Each subscriber has been entered as you request.

"S. J. L., of Ala."—We cannot furnish Vol. 3 of the Sci. Am., sorry to say so. Please thank the Editor of the Monitor, for his interest in circulating our Journal—accept the same also for yourself.

"N. A., of Me."—If you have a new improvement, you had better make a direct application for Letters Patent instead of applying for it as an improvement; we advise thus in consequence of the long time since your patent was granted. Gutta Percha has been used in this city between fabrics, to render them water proof. You may have a different way of effecting this result.

"J. D., of Va."—There was no mistake in regard to Ranlett's Architect, as you will see from the numbers sent, on the 3d inst. We enclosed them in two separate parcels, 5 numbers in each, and hope you will receive them in good time, condition etc.

"H. V., of N. Y."—If we hear of any such opportunity to purchase a boiler as you represent, we will inform you.

"J. J., of N. Y."—It does not appear that you have discovered any new principle in atmospheric churns. The same dash has been shown us within a few weeks, independant of this, the modifications are not patentable as we view them.

"J. S. D., of N. H."—Your Sci. Am., is sent from this office and will be enclosed with the club, when received, which we hope will be in a few days.

"W. B., of Mass."—We cannot express an opinion in relation to the practicability of your perpetual motion without the opportunity of examining one of them in operation. The combination is new to us; our curiosity is aroused in some measure to learn the result of your experiments although we have little confidence in such contrivances.

"H. K., of R. I."—We cannot object to your views in reference to "Alarms," but should like to hear the result of your experiments before expressing an opinion.

"D. G. S., of Pa."—The drawing of your Paddle Wheel has been examined. For one containing the same principles see No. 36 Vol. 4, "Sci. Am.," page 284.

H. T. B., of St. Louis; W. T. C., of N. C.; M. S., of Ohio; G. K., of Pa.; J. A. C., of Pa.; W. D. M., of Miss.; M. L. S., of Pa.—Shall write you as soon as possible.

Money received on account of Patent Office business, since Dec. 27, 1849:—

S. K. G., of N. Y. $30; T. J., of Mass., $30; F. H. C., and others, of Me., $50; G. S., of Pa., $35; N. S. T., of N. J., $26; R. N. G., of Ill., $30; F. H. T., of Texas, $70, and 3 oz. of Gold Dust from F. G. U. H., of San Francisco—value $48.

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Among other features of our paper, worthy of note, may be mentioned the department for Farmers, in which origiual articles appear weekly from the best agricultural writers in New England; the Financial and Business department, under the direction of an accomplished financial writer; the Markets, which we report with more than usual fullness; the Shipping List, into which we condense with grear care, all marine intelligence of interest, to New England readers; the News Department, to which careful attention is devoted; besides which is given early intelligence of all new inventions, and discoveries, sketches of travel, historical, biographical and scientific articles, Sunday readings, puzzles, enigmas and problems, humorous sketches, and everything else that can benefit or interest the ordinary reader. The Illustrations will be continued weekly, and an entirely new field of embellishments will be entered upon.

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For the Scientific American.

On Tanning Leather.--Preparation of Hides.

(Continued from page 128.)

Mr. J. Burbridge, of England, published in 1825, a work called the "Tanner's Key," wherein he states that he tanned crop hides of the very best quality in 101 days, during mild weather. He says "lime your hides about a week, then unhair them and let them soak in a running stream of water 12 hours; then flesh them, and afterwards run them through the running brook again—all the lime should be completely washed away. When the hides are thus prepared, they should be immersed in tannin liquor at the strength of five degrees of the hydrometer, and in this liquor they should be handled frequently for three days, then shift them into liquor of seven degrees strength, and continue this shifting, until the gluten in the skins is dead—which will take about two months, during which time they should be well handled, and as often as possible, and sometimes a little bark added to keep up the strength of the liquor, which should never be allowed to be weaker than the tan vat in which the skins have once been in, or the skins will be injured. The strength of the liquors must be gradually increased from 5 degrees up to 15, and sometimes 20, and if after they have remained in this strong liquor three days, and the said liquor not weakened any, it is a good sign they are quite tanned."

There is not a single tanner but should use an instrument to test the strength of his liquors. Without it he may be said to have a system, but employs no sure sentinel to stand guard over it. And if he desires to try experiments, he is not sure of accuracy unless he uses the hydrometer. Some bark, pound for pound, is inferior in strength to others—what then is to guide the tanner without his glass? Nothing but guess work.

It sometimes happens that after tanning for some months, the centre of the hide is not quite like the outside, it is then necessary to give the last liquor pretty strong and somewhat warm. In England some recommend *valonia* (an acorn brought from the Levant) which being ground, is scaled at the rate of 200 pounds to 200 gallons of water, and added to the strong bark liquor vat. This is said to be a good plan and makes beautiful leather. As such a plan is not suited to America, some other substance should be used, and there can be no doubt but that if our tanners, who use hemlock bark exclusively, would give the last liquor to their skins of oak bark, they would find a great improvement made in their leather—and one that would pay. Those who use oak bark should give a change, too, in finishing it, such as using (willow, if it were possible) the bark of the yellow oak, or good sumac.

The tan vats are strong rectangular wood boxes, or holes made in the earth, and cemented up inside with a facing of brick, and they are made of such size as are necessary for the work required—the batch of hides to be immersed at one time. It is common to hang up the hides, suspending them in the tan pits, but this should not be done until the hides are half tanned. The liquor in the pits are tapped, so that the exhausted liquor is pumped out, and the liquor from the next strongest pumped in, and so on, the last getting the additional strong liquor. It would be a good plan, if all the bark chips were boiled and the liquor only used. If bark is boiled to extract its strength and then the bark and liquor thrown into a vessel, and left to stand for some days, it will be found that the strength of the liquor is afterwards absorbed by the bark.

Many patents have been taken out, both in America and Britain, for improvements in Tanning. One process was no other than to tan the hides in air-tight vats, extracting all the air by an air-pump. One was granted to Mr. Brown, of New York, for a curious and good manner of working the leeches, and working or handling the hides by reels—a good plan. Another plan was proposed to prick the hides with fine perforations, to let in the tannin to the centre of the hide—not a very commendable plan, we think. Another plan was to evaporate, by artificial heat, the ooze from the one side of the skin, while the tan liquor was applied to it cold on the other. This plan was patented in England about 18 years ago, and although it was stated to tan the skins well in about ten days, yet it was so evidently troublesome and expensive that it made no advancement in public favor. A great number of patents might be enumerated. Such as one for revolving hides on the periphery of a wheel—a number being used, and another to agitate the hides in the pit, simply by a paddle wheel revolving in it, to move the hides, which are not to be crowded in the pit—a very good plan indeed.

The whole secret of tanning lies in great carefulness, plenty of labor and patience.—Let the hides be well cleaned of their lime, &c., before they are immersed in the tan liquor, and let them be well handled and changed every four days, or oftener, and pay attention to the strength and heat of the liquors, and there is no danger.

Hemlock, oak bark, and sumac, are the most common tannin ingredients used in America. Sumac is coming more into use lately, great quantities of it are now employed for all kinds of the finer hides, but hemlock is generally used for sole leather. The liquor in the vats should not be more than milk warm.

History of Propellers and Steam Navigation.

[Continued from page 128.]

FIRST SEA VOYAGE—ARGYLE AND THE SAVANNAH.

By the latest news from Europe, we learn that Sir Isambert Brunel, the great Civil Engineer, who completed the celebrated Thames Tunnel, has finished his course and departed. But Sir I. Brunel did not project the Thames Tunnel. The man who first designed that great work was the person who performed the first sea voyage in a steamboat. That man was George Dodd, whose life was full of eventful actions—whose death was within the walls of a prison.

After Henry Bell had established steamboat navigation in Europe, it was still a question whether or not steamboats could be employed for open sea navigation—nautical men entertained the opinion, that they were unfitted to brave it. George Dodd, a London Engineer, a young man of great resolution, was sent down to Scotland and purchased the Argyle, a steamboat which used to ply between Glasgow and Greenock, (20 miles.) She was 70 tons, 79 feet keel, 16 feet beam, had an engine of 14 horse power, and paddle wheels of nine feet in diameter. She was purchased to run on the Thames: John Wood was the builder. She had her engine in the middle, the boiler on the starboard side, and a fly-wheel on her larboard side. Her funnel (smoke pipe) did the duty of a mast and carried a square sail. Mr. Dodd's crew consisted of a mate, four seamen, an engineer, stoker and a cabin boy. He left Glasgow, not without great misgivings on the part of many people in that city, but he had full confidence in his boat and crew, and boldly put to sea. (We would like to give the whole of this remarkable voyage of 758 miles, on a dangerous sea, and amid tremendous storms.) He established the feasibility of sea steamboat navigation. His vessel must have been a good one, and her engines of excellent construction, for he used only one ton of coals for 100 miles: better than that is not done now. When it is considered that this vessel was only 14 horse power, it required no ordinary courage to embark on such a dangerous voyage; and when it is remembered how successfully this voyage was completed, we must give credit to the old Argyle, as the first worthy sea steamboat, and the unfortunate George Dodd, the first sea steam navigator. Although steamboats had been running in Scotland for five years before, when the Argyle entered the Thames and came to London, she was regarded with the most intense wonder.

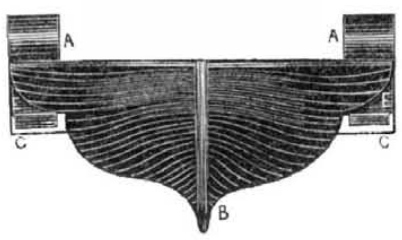
The first steam ship that crossed the Atlantic was the American steamship Savannah, built in New York, in 1818, which, under her commander Moses Rogers, sailed from Savannah, Geo., on the 25th of May, 1819, direct for Liverpool, and made the passage in 22 days. She was 350 tons burden, had one engine of 80 horse power, and was a good sailer, making at the rate of 8 knots per hour in pleasant weather. When she approached the west coast of Ireland, the telegraph station at Cape Clear, reported her as a ship on fire, and one of the Navy Cutters was despatched to her relief—great was their surprise to find her a live American steamboat. Before this, however, on the east coast of Ireland, steamboats were well known, and a regular line between Glasgow and Belfast had been established by David Napier, for more than a year.

When the Savannah came to Liverpool she excited much surprise. On approaching the city, the shipping, piers and roof of houses were thronged with an excited populace, cheering the adventurous craft. During her stay at Liverpool, naval officers, and noblemen and merchants from London came down to visit her, and were singularly curious to ascertain her speed, destination, &c. As it will be remembered, this was soon after Jerome Bonaparte had offered a large reward to any one who would succeed in rescuing his brother Napoleon, then at St. Helena, this was the suspected design of the Savannah's visit. After a stay of 28 days in Liverpool, during which time the ship was visited by thousands of people of rank, and her officers the while treated with marked attention, she left for Copenhagen, Denmark.

To the Savannah belongs the credit of making the first steam voyage across the Atlantic, and to Capt. Rogers the credit of being her first commander. It is astonishing that after this we hear no more of the Savannah as a sea steamboat. Why was it that from 1819 to 1838 no other steamship navigated the Atlantic from America to England? We cannot answer.

In 1819 three very scientific gentlemen of Glasgow, Scotland, conceived the idea of propelling vessels by water in a very different way from Rumsey or Linaker. The scheme was to discharge water behind with great velocity, from pipes placed under the surface,—using the water underneath the surface, somewhat as a fulcrum. After an expensive experiment the propelling power was found to be totally inefficient to compete with paddle wheels, and it was therefore abandoned.

FIG. 12.



In 1822 a Mr. D. Gordon, of London, invented the casing for the paddles, allowing the water to enter at an aperture below the level of the water line, but allowing the water to leave freely at the back. This figure is a view towards the head of the vessel. A is the paddle wheel case; B the fore part of the keel, and C the place for the water to enter, below the water line, E. The aperture to admit the water, was furnished with a sluice to admit a greater or less quantity of water, according to the velocity of the vessel or the roughness of the water. This invention was tried—but to be laid aside.

The Tea Plant in America.

Dr. J. Smith of Greenville, S. C., says that the tea plant, with ordinary care, will flourish upon Long Island. They ought not be housed, or put into hot-houses; that would weaken the vigor of the plant. In very severe weather, whilst young and delicate, they will require covering with clean straw,— not with the litter of a stable. In two or three winters they will stand the temperature as well as an oak. To show this fact, I have one green tea plant in my tea garden, planted out last December, fresh from the case in which it was imported, weakened by the voyage, and heat of the packing, which was never recovered or protected in any way, that stood the severe cold of February last, with the thermometer at zero!—The leaves which remained after transportation, dropped off, but the branches and twigs, ten to fourteen inches in length, remained uninjured, and came out in April in fine leaf and in that condition now, as fine a plant as ever grew. There the plant stands, an incontrovertible fact.

LITERARY NOTICES.

TREATISE ON MARINE AND NAVAL ARCHITECTURE, OR THEORY AND PRACTICE BLENDED IN SHIP BUILDING.—This is the title of a new work, by J. W. Griffiths, Esq., Marine and Naval Architect, N. Y., a gentleman of eminent scientific qualifications, and great practical experience. The subject of the author is one of great importance, especially to the United States. No European work of the kind is of much use, if we can believe no less authority than Admiral Sir Charles Napier, who, in a recent letter to the London Times, proves incontestibly, that ship-building, as a science, is not understood by the best authorities of that Maritime Nation. New York has long been famous for ship-building, and as a matter simply of experience, the work of Mr. Griffith would be a valuable acquisition to our store of knowledge on this subject, but he aims at a higher object. To use his own words, it is "designed to form the connecting link between science and practice, with a view to the elementary instruction of those who have not previously studied the principles of science in modelling and building ships." The first number of the work commences at the root of the matter, with the history of ship building, equilibrium of fluids, &c. The letter press is good, and the whole work is to be illustrated with 50 beautiful engravings, and 12 Nos., at 75 cts. each, is to complete the work—thus placing it within the reach of every man. From the first No. which is before us, we have no hesitation in stating, as our own opinion, "that it will be *The Book of Naval Architecture*."

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